United States Department of Agriculture

Natural Resources Conservation Service

INTERNATIONAL PROGRAMS DIVISION

التبلل وإغلاق الشق. والطريقة الأخيرة، لا تصلح إلا للدراسة التفصيلية، فى حين إدخال السلك أسرع نسبيا ويمكن أن يتم فى ملاحظة واحدة. والشقوق المنفذة (Penetrant) عمقها 15 سم أو أكثر إذا قيست بإدخال السلك. والشقوق المنفذة ومتصلة السطح (surface connected) توصف بأنها منفذة متصلة السطح (penetrant surface connected). وتعمل هذه الشقوق على زيادة ترشيح البرك العابر. ويعتمد بروز الشقوق النافذة متصلة السطح على المسافة الخطية لهذه الشقوق فى وحدة المساحة من سطح الأرض. وقد تتناقص المسافة الخطية مع زيادة أعماق الشق. ولا تعطى لها أقسام.

شكل 3-31: قطع طبيعية تكونت بتشقق تربة متكتلة (massive) إنكمشت بالتجفيف.

مظاهر السطح الداخلية (Internal Surface Features):

تشمل المظاهر السطحية (1) أغلفة من مجموعة متنوعة من المواد بخلاف مواد التربة المجاورة تغطى جزء أو كل السطوح، (2) مواد تتركز على الأسطح عن طريق إزالة مواد أخرى، و (3) تكوينات الإجهاد التى فيها إعادة توجيه أو تعبئة طبقات رقيقة على الأسطح عن طريق الإجهاد أو القص. وكلها تختلف عن المواد المجاورة فى تكوينها أو التوجه أو التعبئة. ويمكن أن يشمل وصف ملامح السطح: نوع، وموقع، وكمية، واستمرارية، وتمييز، وسمك المظاهر. وبالإضافة إلى ذلك، اللون، والقوام، وغيرها من الخصائص التى يمكن وصفها، لا سيما إذا كانت تتباين مع خصائص المواد المجاورة.

الأنواع (Kinds): تتميز ملامح السطح بالاختلافات فى قوام أو لون أو تعبئة أو توجه الحبيبات، أو التفاعل مع الاختبارات المختلفة. وتوصف السمة إذا كانت مختلفة عن المواد المجاورة ولو لم يمكن تحديد نوعها.

أغلفة طينية (Clay films): ترادف (clay skins) وهي طبقات رقيقة موجهة ومنقولة من الطين.

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IPD Newsletter

July—December 2020

COVER PHOTO: *Images of the Arabic translations of the 1993 NRCS Soil Survey Manual.*
SEE ENTRY ON PAGE 3. *Photo courtesy of Soil and Plant Science Division*

The IPD Newsletter is a biannual publication produced by the International Programs Division of the Natural Resources Conservation Service (NRCS).

The document provides a six-month overview of NRCS participation in international activities, which included providing technical assistance and exchanging scientific and technical information.

Submit articles, photos, and comments to the newsletter point of contact:
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Activities

Saudi Arabia

Kenneth Spaeth, Rangeland Management Specialist, Central National Technology Support Center from Fort Worth TX, Hong Wang, Civil Engineer, National Water Management Center, from Little Rock, AR, and Jon Fripp, Hydraulic Engineer, National Design, Construction and Soil Mechanics Center (NDCSMC) from Fort Worth TX, participated in developing the U.S. Government's online presentation at the G-20 International Virtual Experts Meeting on Promoting Sustainable Agriculture Development in Drylands meeting chaired by the Kingdom of Saudi Arabia on August 10th. The team provided their expertise to the through planning meetings, providing information, and reviewed various draft versions of the presentation with the Office of the Chief Scientist (OCS). The meeting was divided into four sessions: 1) Key risks, opportunities and system approach for sustainable agricultural development in drylands; 2) Enabling tools for sustainable agricultural development in drylands; 3) Biotic factors affecting sustainable agricultural development; 4) Innovation, technology & adoption to enhance resource use efficiency.

During the half-day meeting there were 30 presentations by 15 countries and 3 international organizations. Around 70 participants joined the meeting. Q&A on presentations was limited in the chat box but there was a brief discussion period at the end. OCS delivered the presentation for NRCS' slides, since the presentation was higher level, covered multiple agencies, and the presentation was limited to 7 minutes.

The USDA presentation 'Collaborative US research highlights: Providing a range of tools and resources for sustainable agriculture in drylands' can be found at the meeting website https://www.macs-g20.org/annual-meetings/current-meeting/saudi-arabia-2020/

U.S. Department of Defense

Jon Fripp, Hydraulic Engineer, NDCSMC from Fort Worth TX, Michael Kucera, Agronomist, National Soil Survey Center (NSSC) from Lincoln NE, and colleagues from USDA's Agricultural Research Service and Foreign Agricultural Service participated and made a joint presentation on USDA public engagement practices at an online workshop hosted by the Joint Special Operations University under the U.S. Special Operations Command (USSOCOM) on September 15 to 17. The workshop tried to address potential integrated opportunities that arose as a result of COVID-19. Issues discussed included the devastation by locusts across East Africa, the Middle East and South Asia and the likelihood of starvation due to

the severe economic dislocation. Jon and Michael focused on the importance of soil and water in agricultural productivity. USSOCOM recognizes the potential opportunity in engaging with the interagency, and USDA's experts, to develop relationships with local farmers to further U.S. national security interests.

Egypt

Dr. Mahmoud Khairy, Ministry of Agriculture and Land Reclamation, of the Arab Republic of Egypt completed an Arabic translation of the 1993 version of the Soil Survey Manual in September. This major USDA publication in the field of soil science is now available to a greater audience of non-English speaking and reading scientists. Dr. Moustafa Elrashidi, National Soil Survey Center, Research Branch, provided a review prior to the release of the final version.

The translation can be viewed or downloaded at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcseprd1652414

Dr. Khairy is currently working on the translation of the 2017 version.

Food and Agricultural Organization

The Food and Agricultural Organization (FAO) Global Soil Partnership's (GSP) Global Soil Laboratory Network (GLOSOLAN) held its first plenary meeting on spectroscopy on September 23 to 25, 2020, attracting over 200 participants from nearly 70 countries. David Hoover, Director, National Soil Survey Center and David Lindbo, Director, Soil and Plant Science Division (SPSD) attended this event.

This meeting built on a 2019 meeting at the National Soil Survey Center that focused on standardizing the Mid Infrared (MIR) soil spectrometry analysis. While identifying activities to resolve key technical issues, GLOSOLAN conceived the idea of designating a single reference laboratory for the collection of data used to calibrate models. The NRCS Kellogg Soil Survey Laboratory (KSSL) was selected as the world hub for collecting measured and spectral data that would serve global efforts to predict soil properties from MIR spectra.

The meeting in September developed five action plans to move forward this initiative. This initiative serves the interests of progressive organized science around emerging technologies that will be useful in the U.S. and abroad. David Hoover was impressed by the large number of countries that recognize the USDA as a leader in soil science and the often-stated "gold standard" that the KSSL represents in soil laboratory data, procedures and standards.

For information on the initiative: http://www.fao.org/global-soil-partnership/glosolan/soil-analysis/dry-chemistry-spectroscopy/en/

For presentations at the meetings: http://www.fao.org/global-soil-partnership/glosolan/soil-analysis/dry-chemistry-spectroscopy/presentations-1st-spectroscopy-2020/en/

For the original concept note: http://www.fao.org/3/ca8431en/ca8431en.pdf

Argentina

The Argentine Republic, an adopter of the National Cooperative Soil Survey (NCSS) standards for inventorying soil resources held their XXVII Congress of Soil Science of Argentina on October 14. The

Soil Profile of Ensaenada Grande Soils

congress was sponsored by the Argentina Association of Soil Science. Luis Hernandez, Northeast Regional Director from Amherst, MA represented USDA-NRCS Soil and Plant Science Division and made a virtual presentation at the event. Luis discussed the "recent advances of the USA National Cooperative Soil Survey Program." The presentation included information on NCSS standards, urban soil survey, coastal zone soil survey, ecological site inventor, dynamic soil properties and dynamic soil survey.

The audience was impressed by how the NCSS program promotes cooperation and its inclusivity of partners. The audience was also impressed by how the U.S. soil survey program, evolved to generate soil information for urban and coastal areas.

Luis highlighted the team effort and organizational structure of the U.S. soil survey program that include seven soil survey regions, 124 Major Land Resource Area (MLRA) soil survey offices, NSSC, Kellogg Soil Survey Laboratory, National Headquarters (NHQ) Soil and Plant Science Division, and a dispersed multi-disciplinary workforce dedicated to conduct the work across the entire nation.

On December 15, 2020, a virtual meeting was held between representatives of the Argentina National Agricultural Technology Institute (INTA) and NRCS SPSD. The objective of the meeting was to explore potential opportunities for collaboration. INTA was represented by Dr. Lucas M.

Moretti, Director of the Argentina Soil Survey Program, and Dr. Ditmar B. Kurtz, Soil Scientist at Corrientes Experimental Station. SPSD was represented by Dr. Dave Lindbo, SPSD Director, and Luis A. Hernandez, Northeast Regional Director, Amherst, MA. Dr. Moretti provided an overview of the current status of Argentina's soil survey program. Dr. Lindbo shared information about how SPSD conducts international soil survey activities including soil classification and soil taxonomy, urban soils, hydric soils, land evaluation and digital soil mapping.

The group agreed to schedule additional informational sessions and continue exploring opportunities of bilateral interest, technology transfer and capacity building. This effort has the potential of providing opportunities to SPSD staff and NCSS members to engage in international soil survey activities.

Colombia

The USDA/NRCS Soils Information Branch conducted a virtual Brownbag luncheon presentation on the Cacao for Peace: Geographical Information System Mapping for Optimized Cacao Production in the Republic of Colombia by the Foreign Agriculture Service (FAS) on August 20. Approximately 29 participated in this online meeting. FAS led the presentation on the joint effort to collect comprehensive soil properties and cacao genomics. This project works to understand the variability of soils and cacao varieties to delineate suitable areas for optimal cacao production. Cacao for Peace (CfP) is a collaborative effort among the International Center for Tropical Agriculture, NRCS Soil and Plant Science Division, and Pennsylvania State University.

Screenshot of CfP web platform

CfP is an initiative sponsored by the U.S. Agency for International Development (USAID) through FAS and seeks to improve rural well-being through agricultural development to improve the economic opportunity of cacao farmers, and stability to support Colombia's recovery from civil war and social unrest.

Andres Romero, CfP Team Lead and Program Manager in the Agricultural Economic Development Division of Global Program in FAS explained CfP is a 5-year, $5 million initiative funded by USAID and will run through January of 2021. CfP is a collaborative effort to collect and analyze soil and cacao tree samples to determine favorable conditions for growing in the Sierra Nevada de Santa Marta Region of Colombia.

The CfP project seeks to increase yields and the quality of cacao from Colombia to benefit U.S. fine chocolate makers and to provide Colombian farmers alternatives to illicit crop cultivation. One output of the project is a Geographical Information System (GIS) Web Application. The web application displays the soils and cocoa genetic data collected as well as interpretations and other information will enable policy makers, farmers and investors to make informed decisions and optimize cacao production in the region.

Andres then introduced Paul Reich, Geographer, Soil and Plant Science Division, who developed the GIS tool to provide an overview of web application, and the value and utility of the soils and cocoa genomics information. Paul explained the icons on the webtool and demonstrated how to use the cocoa web map application to retrieve soils and cocoa genetics information from the pilot project area.

Although still incomplete, the application is already operational for use on computers or smart phones accessible by local farmers and policy makers. The team is still fine tuning the digital soil map components. The link to the web platform for CfP is https://arcg.is/1HmGrL. Once completed, project deliverables will be available for use by stakeholders, researchers, or the general public in Colombia and around the world.

India

The Indian Council on Agricultural Research's (ICAR) Indian Institute of Soil Science (IISS), Bhopal, Madhya Pradesh in the Republic of India and the World Agroforestry, Nairobi, Republic of Kenya jointly organized an *International Webinar* on "Soil Spectroscopy: An Emerging Technique for Rapid Soil Health Assessment" on October 1. The webinar was organized in the pursuit of developing the fast, cost -effective, environment-friendly, non-destructive, reproducible and repeatable analytical technique for soil characterization and assessment to achieve government objectives such as Soil Health Cards. Approximately 850 participants representing 28 countries from scientific, educational, private and public research institutions were in attendance.

During the webinar, Dr. Kuntal Hati of ICAR-ISSS and his team delivered a presentation on "MIR Spectroscopy for Soil Health

Assessment: An Indian Perspective" where they acknowledged the leadership of NRCS SPSD, NSSC and the KSSL in this field. The use of spectroscopy has the potential to improve measurements in near real time. This data allows planners and producers to effectively manage their land. SPSD intends to continue this line of research and analysis to find ways to best integrate the methods into its current database and field procedures.

South Asia

Caritas Switzerland, with funding from the Department of State hosted a Virtual Regional Dialogue on Agricultural Water Pollution and Water Management in South Asia on November 17—19. The conference collected and disseminated the learning from Caritas' agricultural water pollution initiatives in South Asia and create a stakeholder network of related professionals and organizations working in the theme. Organizations from the People's Republic of Bangladesh, Republic of India, Federal Democratic Republic of Nepal, and the Democratic Socialist Republic of Sri Lanka participated.

Jon Fripp, Hydraulic Engineer, NDCSMC from Fort Worth TX, presented on "Agricultural Water: Incentivizing Efficient Practices". He discussed NRCS' experience addressing general problems in water quantity, quality and usage. This included issues with water sources - rain, groundwater, surface water, sedimentation in reservoirs and irrigation usage improvements. His session was repeated twice and provided further information on riparian buffers, organic farming, subsurface drip irrigation, no till farming, low resource farmer irrigation and solar chlorination for drinking water.

Shaun McKinney, Director of the West National Technology Support Center, from Portland OR, presented and provided analysis tools in regard to the NRCS conservation planning process and infrastructure. Discussions focused on how NRCS' lessons and tools could be used internationally to meet water quality needs in South Asia.

Caribbean Area

NRCS joined groups from across the globe to celebrate World Soil Day on Saturday, December 5th with the United Nations Food and Agriculture Organization. World Soil Day promotes the importance of sustaining healthy ecosystems and human well-being by addressing the increasing challenges in soil management and raising the profile of healthy soil by encouraging governments, organizations, communities and individuals around the world to engage in proactively improving soil health.

In the region, NRCS joined the team of the Arte-Soil-Ser Inc. Project on a virtual conference to celebrate World Soil Day and disseminate the importance of soils. The Arte-Soil-Ser Inc. Project's mission focuses on integrating soil science with the arts and humanities. Saturday's activity highlighted a range of academic, community and groups related to soil. NRCS shared the importance of the soil resource in an interdisciplinary way, from agricultural sciences, anthropology, architecture, engineering, agriculture, arts and more. There were two sections of presentations with multiple speakers.

http://www.fao.org/world-soil-day/en/

International Visitors

Pakistan

On September 2, Brent Draper, State Irrigation Engineer in Utah and Jon Fripp, Civil Engineer in Texas met online with ten Pakistanis as part of the Department of State's International Visitor Leadership Program (IVLP). The IVLP provides short-term visits to the U.S. by current and emerging foreign leaders in a variety of fields to cultivate lasting relationships with their American counterparts. NRCS discussed how the U.S addresses water management, distribution and pricing in water-scarce environments. Brent presented on Irrigation Programs in the arid west and discussed desalinization programs in Utah. Jon provided a presentation on improved water management distribution, and pricing in water-scarce environments where he provided an overview of NRCS' history, processes and programs to serve the American people.

Spain

On July 29, a soil scientist from Catalonia, Spain delivered a presentation on Soil Survey of Catalonia to NRCS SPSD Leadership Team. The Microsoft Teams platform was used to connect all participants over the internet. Mr. Emilio Ascaso, is associated with the Institute of Cartography and Geology of Catalonia and presented information about current status of the soil survey of Catalonia, the implementation of their current work, and highlighted the outstanding collaboration between SPSD and Catalonia soil

scientists. Mr. Jaume Boixadera, with the Department of Agriculture of Catalonia, also joined the presentation and highlighted the importance of soil survey information for conservation and agriculture activities in Catalonia.

On October 14, Mark Xu, Director, Resource Inventory and Assessment Division (RIAD) and Dan Mullarkey, RIAD, gave a presentation to the Spanish Counselor of Agriculture, Fisheries, and Food, and members of her staff from the Spanish embassy. They presented on how NRCS measures outcomes and how the information from the Conservation Effects Assessment Project is used for informing conservation decisions at multiple scales. The embassy staff were very appreciative and are planning to schedule follow-up meeting to further explore topics of interest.